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Income Sorting

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It's Elementary

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Income Sorting

One of the most enduring features of the American federal system is the concentration of higher-income people in places where the neighborhood amenities and public services are better. This phenomenon, which scholars call income sorting, is a key source of inequality in our society, because it implies that low-income people tend to live in places where, among other things, the public schools show relatively low performance, the crime rates are relatively high, and the air quality is relatively poor. This column provides a new way to summarize the importance of income sorting in our society.

The starting point for understanding income sorting is the recognition that metropolitan areas in the United States are divided into many different local governments. Consider the case of school districts. A few metropolitan areas, such as Las Vegas-Henderson-Paradise, Nevada, have a single school district, but most metropolitan areas have many school districts, and some have an astonishing number. The New York City area has 775! Table 1 shows the number of districts, the student population, and the number of districts per 100,000 students for several metropolitan areas.[1]

Table 1. School Districts and Students in Selected Metropolitan Areas, 2010

Metropolitan Area	Number of School Districts	Number of Students	Districts per 100,000 Students
Jacksonville, Florida	7	206,400	3.39
Charlotte-Gastonia-Rock Hill, North and South Carolina	10	295,265	3.39
Indianapolis-Carmel, Indiana	50	298,492	16.75
Akron, Ohio	45	101,000	44.55
Milwaukee, Wisconsin	68	239,900	28.35
Pittsburgh, Pennsylvania	104	316,933	32.81
Phoenix-Mesa-Scottsdale, Arizona	321	734,000	43.73

With so many school districts, other local governments, and neighborhoods to choose from, households must compete with each other in the housing market for entry into the places

[1] These examples come from Jennifer J. Holme and Kara S. Finnigan, "School Diversity, School District Fragmentation and Metropolitan Policy," *Teachers College Record* 115 November 2013), pp. 1-29, and Meredith P. Richards and Kori J. Stroub, "The Fragmentation of Metropolitan Public School Districts and the Segregation of American Schools: A Longitudinal Analysis." *Teachers College Record* 116 (December 2014), pp. 1-30.

with the highest-quality public services, the lowest taxes, and the nicest amenities. Higher income is obviously an advantage in this competition. Moreover, this process is self-reinforcing, because higher incomes lead to lower costs for public services (a topic in many of my previous columns) and high-income communities often insure themselves against future changes in their make-up by implementing zoning regulations.

My recent study of the Cleveland area in 2000 provides a new way to measure the income sorting associated with school-district quality, which is measured by the share of students who enter the 12th grade and subsequently pass all five mandated state tests.[2] This study finds that a one standard deviation increase in homeowner income leads, purely because of income sorting, to a 1.30 standard deviation increase in this school passing rate. The average homeowner income is $38,136, and a one standard deviation increase corresponds to a 41.3 percent increase over this average. Moreover, the average passing rate is 32.0 percent and a 1.30 standard deviation increase corresponds to a 82.8 percent increase in this average. This is a large effect; starting from average values, a 41.3 percent increase in income leads to a 82.8 percent increase in the passing rate for the school district where a household wins the competition for housing.[3]

It is also possible to look at sorting in a more general way. With a large sample of house sales and extensive information on structural housing traits, one can estimate the overall value in the housing market of a house's neighborhood attributes, such as school quality and access to parks, associated with each location, where a location is defined as a census block group (CBG) or some other small geographic unit.[4] This value can be called "neighborhood quality" or "neighborhood housing value." The extent of income sorting can be measured by examining the relationship between neighborhood quality and income. The result for the Cleveland area is plotted in Figure 1. The horizontal axis is the median income of a homeowner in a CBG. This variable is expressed in log form. A log of 10.0 corresponds to an income of $22,026; a log of 12.0 indicates and income of $162,755. The vertical axis is neighborhood quality. This variable is also expressed in log form; the units are arbitrary, but a percentage change is not. Each dot in the figure represents a CBG.[5]

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[2] John Yinger, "Hedonic Markets and Sorting Equilibria: Bid-Function Envelopes for Public Services and Neighborhood Amenities," *Journal of Urban Economics* 86 (March 2015), pp. 9-25. There are 74 school districts in my Cleveland area data set.

[3] These figures refer to the gross impact of income. As shown in my paper, if one controls for other demand factors, such as the number of children in a household, the impact is 52.2 percent instead of 82.8 percent.

[4] This approach has been used by many scholars other than me, including Yongheng Deng, Stephen L. Ross, and Susan M. Wachter. "Racial Differences in Homeownership: The Effect of Residential Location," *Regional Science and Urban Economics* 33 (5)(2003), pp. 517-56; and Dennis Epple, Michael Peress, and Holger Sieg, "Identification and Semiparametric Estimation of Equilibrium Models of Local Jurisdictions," *American Economic Journal: Microeconomics* 2 (4)(2010), pp. 195–220.

[5] Along the fitted line, neighborhood quality increases 304 percent from the lowest to the highest value. My article cited above finds that neighborhood quality increases 30 percent from the lowest to the highest value of the school-quality measure discussed earlier; that is, school quality changes make up about 10 percent of the overall neighborhood quality change.

This figure indicates a strong relationship between overall neighborhood quality and income. On average, a one percent increase in homeowner income leads to a 0.524 percent increase in neighborhood quality. This relationship is illustrated by the "fitted values" in the figure. Another way to express this result is to say that starting from the average values, a 10 percent increase in income ($3,814) leads to a 5.24 percent increase in the amount households are willing to pay for neighborhood quality, holding housing characteristics constant.

This income sorting is a central cause of inequality in local public service outcomes. Compared to higher communities, low-income communities must pay more to obtain the same quality of local public services, must levy higher local tax rates to raise the same revenue, and end up with lower-quality public services. In the case of education, income sorting is the main reason for large disparities in school quality, as measured by test scores and graduation rates, between high-income and low-income school districts. States have made efforts to offset these disparities, which are clearly unfair to children in low-income districts, by implementing educational aid formulas in which aid increases with share of students from poor families and decreases with district wealth. These programs are admirable, but they do not come close to eliminating these disparities. Under some circumstances other public policies, including inter-district choice, housing vouchers, and inclusionary zoning, make small contributions to lowering these disparities. Income sorting is a powerful phenomenon, however, and no set of feasible policies to eliminate its impact on inequality in education and other public services has yet been identified.

Figure 1. Income Sorting in the Cleveland Area, 2000